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The use of digital technologies in dental practices in Switzerland: a cross-sectional survey

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KEYWORDS

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SUMMARY

The aim of this cross-sectional survey was to identify the extent of digital technology infiltrating dental practices for the management and the treatment of patients. A survey (68 questions) was mailed to all members of the Swiss Dental Association (SSO). An online as well as postal answer was offered in order to maximise the response rate. The survey was mailed in June 2016 and answers were collected till the end of 2016. The total number of completed surveys was 1,238, which resulted in a response rate of 40%. Most dentists (97%) owned a private computer device and 74% used it for both, private and professional life. 69% of the dental offices had a homepage (69%), whereas a limited number (10%) used social media. The location of the practice influenced the extent of online presence.

For patient administration a software application was used in 95% of the practices. The management of appointments was mainly organized by a digital agenda (73%). Patient's dental history was recorded digitally in half of the practices (53%), whereas in one third (38%) also dental/endodontic/periodontal charts were recorded digitally. One quarter of the dentists (24%) used an additional dental software for patient treatment/planning other than the administration software. In 23% of the dental practices a chair-side CAD/CAM system was available. The survey demonstrated that i) the younger the dentist, ii) the more recent the opening of the practice, iii) the greater the patient catchment area, and iv) the more treatment rooms, the higher the grade of digitalisation of the dental practice.



Introduction

Over the last two decades, digital technologies have been progressively integrated in our lives. Digital devices have changed the way we communicate and are a key gateway for accessing information and knowledge. In 2016, Switzerland ranked 7th in the Networked Readiness Index (NRI) (BALLER ET AL. 2016). The NRI measures a country's propensity to utilize the opportunities presented by information and communications technology.

Digital technologies have influenced our private environment and even more every sector of the economy. Digitalisation allowed automating repetitive working processes. More powerful computers and network infrastructures helped to develop new services such as cloud computing or mobile computing. The Swiss government concluded that Switzerland needs to maximally benefit from the economic potential of digitalisation (STAATSEKRETARIAT FÜR BILDUNG, FORSCHUNG UND INNOVATION 2017). Several governmental initiatives offer financial funds to promote the investigation and development of digital technologies.

In health care, digital technologies are also continuously incorporated. The World Health Organization (WHO) expects that digital technologies will provide a major contribution in improving public health (WORLD HEALTH ORGANIZATION 2018). A study from the Health Tech Cluster Switzerland showed, however, that the degree of digitalisation of health services in Switzerland is estimated as low as 24% (DIGITAL.SWISS 2018). Another study within Switzerland identified health care providers to have a lower grade of digitalisation than the average of all economic sectors (GREIF ET AL. 2016).

Digitalisation helps facilitating administrative processes, e.g. digital management of master data, appointments, and billing. In dental practices, digital technologies offer the same advantages in the administrative work. In addition, the medical history, clinical examinations and comprehensive patient data (e.g. radiographs) may be recorded digitally.

Among the digital technologies presently available for the patient treatment are intraoral scanners (IOS). Models and prosthetic reconstructions may be fabricated by means of computer-aided design and computer-aided manufacturing (CAD/CAM). A prominent representative is the CEREC system, which was developed more than 30 years ago (MORMANN ET AL. 1987). It was demonstrated that an indirect ceramic reconstruction may be fabricated chairside by using a computer allowing the immediate processing of the digitally acquired data. Today, a large number of IOS and CAD/CAM systems are available from different companies (ZARUBA & MEHL 2017).

Three-dimensional (3D) intraoral imaging data can be used for superimposition with 3D radiographic and facial imaging data. This fusion allows the computer-aided planning of orthognathic surgeries, dental implant surgeries and orthodontic treatments. Digital technologies showed the potential to replace conventional techniques in implant and orthognathic surgery (TAHMASEB ET AL. 2014, VAN DEN BEMPT ET AL. 2018). In orthodontics, treatment planning and execution, e.g. clear aligners, may be supported by digital technologies (ROSSINI ET AL. 2015).

Digital technologies were introduced in dentistry decades ago. However, no published information exists on the application of these technologies in dental practices within Switzerland. The aim of this cross-sectional survey was, therefore, to identify the extent to which digital technologies are used in dental practices for the management and the treatment of pa-

tients and to identify factors associated with the use of digital technology.

Material and Methods

A survey comprised of 68 questions (Appendix, German) was developed in order to provide information on the use of digital technologies in dental practices within Switzerland and on the demographics of participating dentists and their expectations related to digital technologies. The survey was available in German, French, and Italian languages. Addresses of dentists were manually extracted from the online database hosted by the Swiss Dental Association (SSO). The address allowed to identify the region in Switzerland. Based on the address, the language of the cover letter and the survey was selected.

The survey was mailed with a cover letter stating the purpose of the survey and emphasizing strict confidentiality of the acquired data. An online as well as postal answering pathway was offered in order to maximise response rate. The cover letter included a QR code as well as the written link to access the online survey. Respondents could also reply by sending back the completed paper survey using the enclosed response envelope.

The survey was mailed in June 2016 and all answers were collected until the end of 2016. In order to encourage participation, the survey was advertised online in the SDJ (during July and August 2016). As a reminder, the survey was advertised in lectures held by faculty members of the department between June and the end of 2016. An additional encouragement for participation was that a lottery was organised among all the respondents giving away a tablet computer to the winner.

The grade of digitalisation of the dentist (A0–A3), the dental practice visibility (B0–B3), and the dental practice's organizational structure (C0–C4) was classified according to preselected questions in the survey (Tab. I).

Data were extracted from the paper and online survey and coded in Microsoft Excel. A dedicated statistical software was used (R Foundation for Statistical Computing) including the package VCD (MEYER ET AL. 2006) to generate mosaic plots for examining the categorical data. Data were grouped according to the demographics of the participating dentists (age and type of specialisation) and their dental practices (areal location within Switzerland and size represented by the number of practice rooms).

Results

Following the exclusion of invalid addresses, the survey was successfully distributed to 3,133 dentists (24% female versus 76% male) in Switzerland. The total number of completed surveys was 1,238, which yielded a response rate of 40%. The survey was returned in written form by 52% of the recipients, whereas 48% answered the survey online. The grade of the dentist's digitalisation in private life is presented in Table II.

More than half of the dentists (57%) returning the survey were aged above 50 years. 42% of the respondents were aged between 31 and 50 years. Only 1% of the surveys were returned by dentists aged under 30 years. The younger the dentist, the higher their grade of digitalisation in private life (Fig. 1). The gender distribution among the respondents was the same as in the addressed study population, 76% males versus 24% females.

The majority of dentists (69%) worked in single-handed practices, 27% of the dentist were associates in group practices, and 2% worked in a university or dental practice run by a public

Tab.1 Selected survey questions with answers classified for digital grading of dentists (A0–A3), online presence of dental practice (B0–B3), and organizational structure of dental practice (C0–C4)

	Grade of digitalisation				
	A0	A1	A2	A3	
A) Dentist					
Do you own a smartphone, tablet or desktop computer in your private life?	No	Yes	Yes	Yes	
Do you use your private smartphone, tablet or desktop computer professionally?	No	No	Yes	Yes	
Do you have dentistry-related software installed on your private smartphone, tablet or desktop computer?	No	No	At least one question had to be answered with yes	At least one question had to be answered with yes	
Do you use online educational program/continuing education or online forums from your private smartphone, tablet or desktop computer?	No	No			
Do you have access to professional documents from outside your practice?	No	No	No	At least one question had to be answered with yes	
Do you have access through the patient administration software from outside your practice?	No	No	No		
B) Online presence of dental practice	B0	B1	B2	B3	
Do you have a computer in your practice?	No	Yes	Yes	Yes	
Does your practice have a homepage?	No	No	Yes	Yes	
Does your practice use social media?	No	No	No	At least one question had to be answered with yes	
Does your practice have a digital news feed (e.g. newsletter)?	No	No	No		
C) Organizational structure of dental practice	C0	C1	C2	C3	C4
Do you have a computer in your practice?	No	Yes	Yes	Yes	Yes
Do you use a digital agenda in your practice?	No	At least one question had to be answered with yes	At least one question had to be answered with yes	At least one question had to be answered with yes	At least one question had to be answered with yes
Do you use a computer software for patient's administration (e.g. billing)?	No				
Do you use digital records for the patient's dental history?	No	No	At least one question had to be answered with yes	At least one question had to be answered with yes	At least one question had to be answered with yes
Do you have digital radiographs?	No	No			
Do you use digital records for dental/periodontal charting?	No	No	No	At least one question had to be answered with yes	At least one question had to be answered with yes
Do you use digital photography?	No	No	No		
Do you have an intraoral scanner?	No	No	No	No	At least one question had to be answered with yes
Do you use additional software for patient treatment/planning other than the administration software?	No	No	No	No	

institution. Similarly, the majority of the respondents (77%) were general dental practitioners, although a significant number of respondents (22%) had some further postgraduate training from a university. One third of the dentists (31%) owned a

specialist title (Weiterbildungsausweis, WBA), issued from the SSO.

Most dentists (97%) owned a private computer (smartphone, portable computer, or desktop computer) and 74% used it for

Tab.II Frequency distribution of digital grades for dentists, online presence of dental practice and organization of dental practice; A0/B0/C0, no digitalisation; A1/B1/C1, low grade of digitalisation; A2/B2/C2, medium grade of digitalisation; A3/B3/C3, high grade of digitalisation; C4, very high grade of digitalisation

A) Dentist	A0	A1	A2	A3	missing data	
	2%	42%	22%	33%	1%	
B) Online presence of dental practice	B0	B1	B2	B3	missing data	
	1%	31%	57%	10%	1%	
C) Organizational structure of dental practice	C0	C1	C2	C3	C4	missing data
	1%	27%	5%	32%	31%	4%

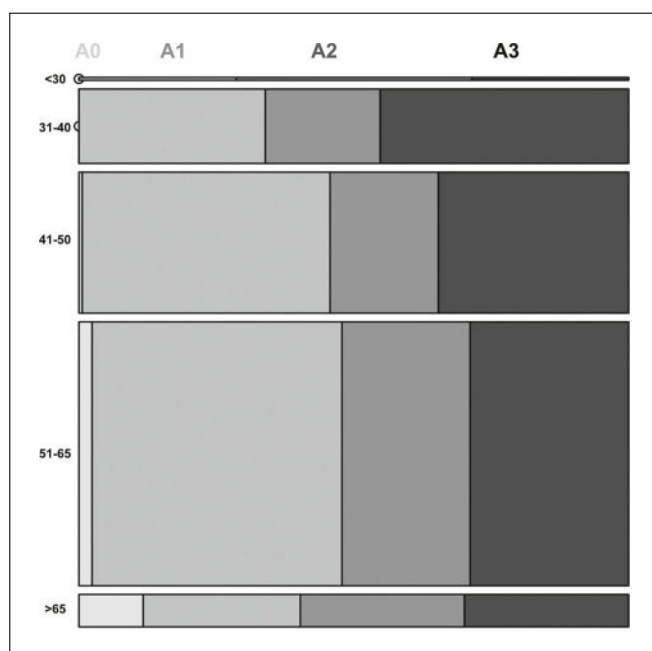


Fig.1 Dentist's personal digitalisation (A0 to A3) in relation to the age. The height of the bars indicates the proportion of subjects within the age group. age <30y: A0 = 0%, A1 = 1%, A2 = 1%, A3 = 1%; age 31-40: A0 = 0%, A1 = 5%, A2 = 3%, A3 = 7%; age 41-50: A0 = 1%, A1 = 12%, A2 = 5%, A3 = 9%; age 51-65: A0 = 1%, A1 = 23%, A2 = 12%, A3 = 15%; age >65: A0 = 1%, A1 = 2%, A2 = 2%, A3 = 2%

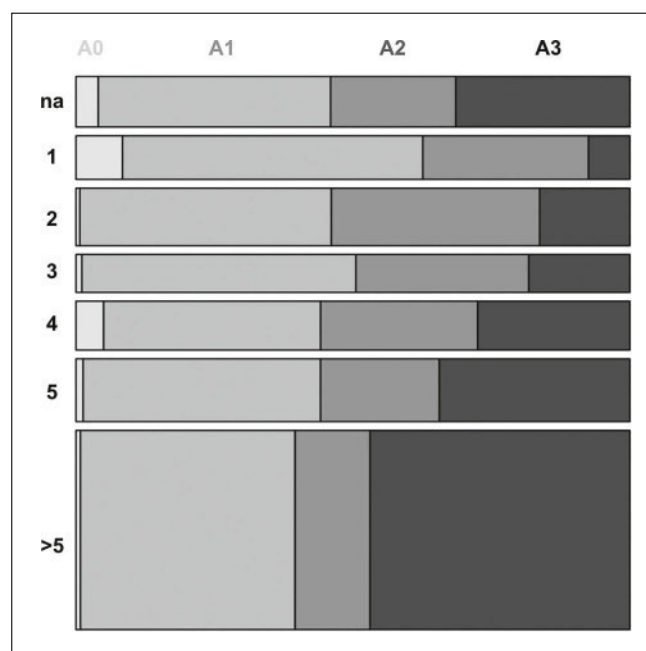


Fig.2 Dentist's digitalisation (A0 to A3) in relation to the size of the dental practice represented by the number of practice rooms. The height of the bars indicates the proportion of practices within the number of practice rooms. na: A0 < 1%, A1 = 4%, A2 = 2%, A3 = 3%; 1 room: A0 = 1%, A1 = 5%, A2 = 3%, A3 = 1%; 2 rooms: A0 < 1%, A1 = 5%, A2 = 4%, A3 = 2%; 3 rooms: A0 < 1%, A1 = 4%, A2 = 2%, A3 = 1%; 4 rooms: A0 < 1%, A1 = 4%, A2 = 3%, A3 = 3%; 5 rooms: A0 < 1%, A1 = 5%, A2 = 3%, A3 = 4%; >5 rooms: A0 < 1%, A1 = 15%, A2 = 5%, A3 = 19%

both, private and professional life. Half of the respondents (51%) had some kind of dentistry-related software on their private digital device installed, and 24% of those used it on a daily base.

Professional documents were accessed from home by 43% of the dentists. One third of the dentists (36%) had access through the practice's administration software. Access frequency of those working from home was daily (41%), once a week at least (41%), and once a month at least (18%). The purpose was mainly to manage patient/practice administration. Only few dentists (3%) used their private computer to plan patient treatment (e.g. virtual implant planning). 39% of all dentists accessed continuing dental education provided online, half of those (58%) at least once a month.

The dental practices of the respondents were mainly (46%) located in an estimated patient catchment area ranging from 10,000 to 50,000 inhabitants. The other half of dental offices

was based in areas with less than 10,000 (22%) or more than 50,000 inhabitants (29%). The majority of the dental practices had either 2 treatment rooms (28%), 3 treatment rooms (36%), or 4 treatment rooms (19%). Dentists with a higher grade of digitalisation in private life were more represented in dental practices with more treatment rooms (Fig. 2).

Half of the practices (52%) were equipped with five or more desktop computers. In 44% of the practices a desktop computer was available in each practice room (reception, office, treatment rooms, x-ray station). Half of the dental offices (53%) were equipped with both a printer and an office scanner (53%), and 32% of the practises also had a portable computer (e.g. tablet). The majority of digital devices in the dental office (78%) were connected to each other by a network solution, which was maintained and updated by the dentists themselves (48%), a professional support provided by the patient administration software manufacturer (29%), or a third-party support (8%).

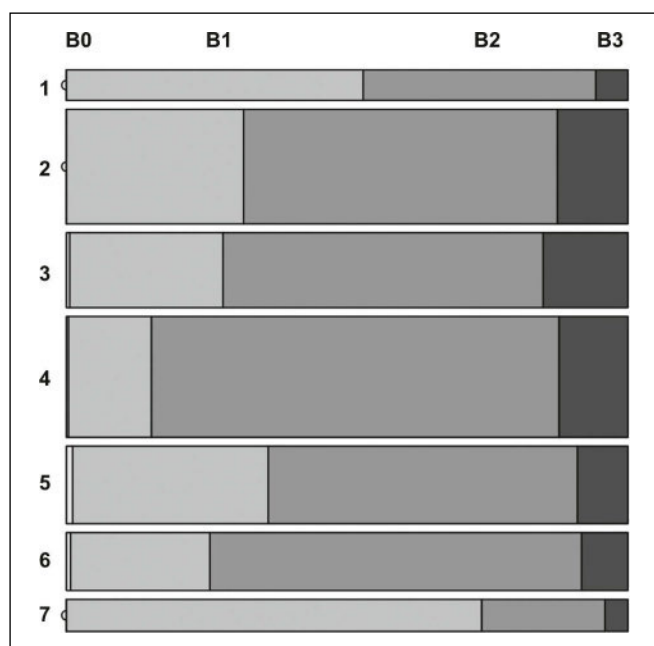


Fig. 3 Dental practice's online presence (B0 to B3) in relation to its areal location. The height of the bars indicates the proportion of practices within the areal location, 1 Region around Lake Geneva (cantons VD, VS, GE), 2 Espace Mittelland (cantons BE, FR, SO, NE, JU), 3 Northwest of Switzerland (cantons BS, BL, AG), 4 Zurich area (canton Zurich), 5 East of Switzerland (cantons GL, SH, AR, AI, SG, GR, TG), 6 Central Switzerland (cantons LU, UR, SZ, OW, NW, ZG), 7 Ticino (canton TI)

Most of the dental offices had a homepage (69%), whereas a limited number (10%) used social media, among which Facebook was the most frequent. The grade of the practice's online presence is shown in Table II. The location of the practice influenced the extent of online presence (Fig. 3).

For patient's contact details as well as for patient's billing, a software was used in 95% of the practices. The management of appointments was mainly organized by a digital agenda (73%) and reminders for appointments were used in 53% of the practices, mostly by means of automated text messaging. Patient's dental history was recorded digitally in half of the practices (53%), whereas in one third (38%) also dental/endodontic/periodontal charts were digitally recorded. Interestingly, most dentists (62%) did not provide the name of their administration software.

Digital technologies were often used for imaging devices, such as digital photography (81%) and digital radiography (65%). Cone beam computed tomography and intraoral scanners were accessible in 18% and 23% of the dental offices, respectively. In addition, 24% of the dentists had an additional dental software for patient treatment/planning other than the administration software. The grade of digitalisation for the organizational structure of the dental practices is shown in Table II. Orthodontists were more represented in C4-graded dental practices (57%) compared to general dental practitioners (29%), oral surgeons (36%), periodontists (40%), and prosthodontists (30%) (Fig. 4). A trend towards a higher digital grading of the dental practice was observed for i) younger dentists, ii) dental practices with a more recent opening, iii) a greater patient catchment area, and iv) more treatment rooms per practice.

For the fabrication of ceramic reconstructions, 23% of the practices were equipped with a chairside system, among those

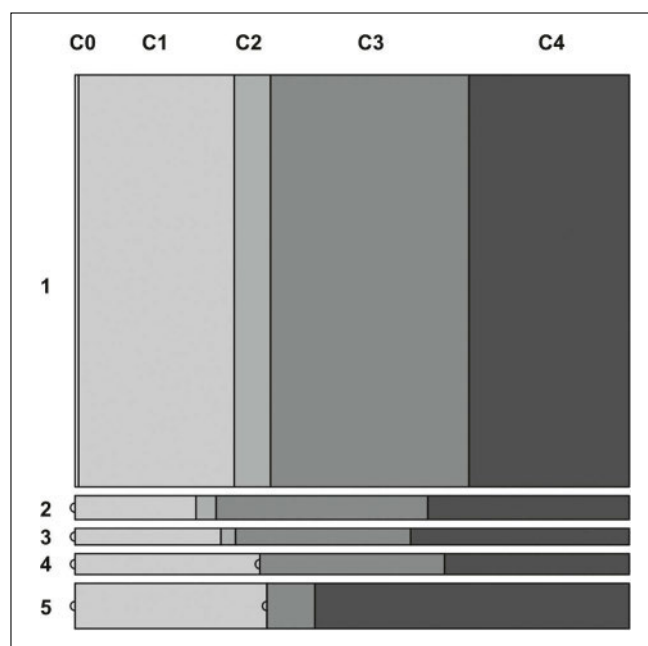


Fig. 4 Frequency distribution of the dental practice's organizational structure (C0 to C4) in relation to the dentist's type of specialization. Left column, 1 General dental practitioner, 2 Oral surgeon, 3 Periodontist, 4 Prosthodontist, 5 Orthodontist

97% used the CEREC system. Dentists graded A3 were more represented in a practice equipped with a chairside CAD/CAM system (45%) compared to practices without (30%). In a laboratory-based fabrication of dental restorations, dentists estimated the use of CAD/CAM technology to range below 20% of the cases (32%), between 20 and 60% of the cases (36%), and above 60% of the cases (22%). For the fabrication of ceramic reconstructions, dentists estimated a conventional workflow (14%), a fully digital workflow (19%), or a combination of both workflows (44%) to be executed. 10% of the dentists did not know the type of workflow used by their dental technicians. More than half of the dentists (57%) did not know the name of the CAD/CAM system used by their dental technicians.

The dentist's satisfaction/expectation towards the use of digital technologies is presented in Table III.

Discussion

The present cross-sectional survey within Switzerland showed that digital penetration in the dental practices was 62% (grades C3/C4). Also, in 31% (grade C4) of the dental practices the patient's treatment may be supported by in-house digital technologies. The survey demonstrated, that i) the younger the dentist, ii) the more recent the opening of the practice, iii) the greater the patient catchment area, and iv) the higher the number of treatment rooms, the higher the grade of the dental practice's digitalisation.

The response rate of 40% found in the present survey was slightly lower compared with a survey having a response rate of 45% resulting from the same study population in 2015 (WÄCKERLE ET AL. 2016). The data acquired in the present survey revealed similar outcomes for the same questions used in both surveys indicated by the frequency distribution of the dentist's type of practice (single-handed practice vs. group prac-

**Tab. III Dentist's general satisfaction/expectations towards the use of digital technologies**

3.1 How do you perceive the increasing influence of computer-aided dentistry?	Very positively	28%
	Rather positively	42%
	Neutrally	23%
	Rather negatively	4%
	Negativel	1%
	NA	2%
3.2 Why do you use digital technologies in your dental practice?	To increase efficiency	55%
	For extension of the treatment indications	15%
	No digital technology available	12%
	NA	17%
3.3 Are you satisfied with the digital systems in your dental practice?	Yes	82%
	No	5%
	NA	13%
3.4 Are you planning to increase the grade of digitalisation in your dental practice?	Yes	41%
	No	51%
	NA	8%
3.5 Do you feel compelled (e.g. by economic competition) to use digital systems in your dental practice?	Yes	20%
	No	74%
	NA	6%
3.6 How do your patients react to digital systems in your dental practice?	Positively	67%
	Negatively	1%
	I don't know	24%
	NA	8%
3.7 Do you think the financial investments for digital systems are appropriate in relation to their benefits?	They are too high	49%
	They are appropriate	43%
	They are too low	1%
	NA	7%

tice vs. public/university setting) and of the dentist's specialization (general dental practitioner vs. specialists).

The present survey may be classified as representative (KRUSKAL & MOSTELLER 1979). The gender distribution of the addressed population was the same as for the respondents of the survey. However, this was the only publicly accessible demographic data, which could be used as an indicator for the representativeness of the present survey. A limitation of the present survey was that the addressed study population was restricted to the members of the SSO. Also, the survey might have been more likely be answered by dentists interested in the topic and may have added a bias to the present survey. Therefore, no statistical analyses were performed.

In private life, most dentists (97%) owned a digital device to access the internet. This number is slightly higher to the one of 90% reported for Swiss consumers (EY DIGITAL NATIONS 2017). The grade of digitalisation of dental practices was 62%. A survey on

the grade of digitalisation (grades 1–4) in small and medium-sized enterprises (SME) in Switzerland revealed a mean of 2.05 for the grade for digitalisation, whereas a lower grade of 1.84 was found for health service providers (GREIF ET AL. 2016). A study from Health Tech Cluster Switzerland showed that the grade of digitalisation in the administrative sector of health services in Switzerland is estimated to be 24% (EY DIGITAL NATIONS 2017). Although a direct comparison between different surveys is difficult (e.g. different parameters used in the classification for the grade of digitalisation), we may conclude that dental practices are highly digitalized.

The high grade of the dentist's digitalisation as well as the long history of CAD/CAM systems in dentistry may explain the high grade of dental practice's digitalisation. Among dental practices, however, the dentist's specialisation influenced the availability of digital technologies for the patient's treatment. The highest grade (C4) was more represented in orthodontic

practices (57%) compared to general dental practices (29%) and to other specialist practices (range between 30% and 40%). It was demonstrated, that the use of digital technologies may improve the treatment outcomes and therefore be of clinical relevance (MUHLEMANN ET AL. 2018; VAN DEN BEMPT ET AL. 2018).

An online survey of UK dentists regarding the use of CAD/CAM technology for the patient's treatment revealed that 56% of the respondents did not use any component of CAD/CAM (TRAN ET AL. 2016). In contrast, the present survey showed that dentists in Switzerland estimated the use of CAD/CAM technology in 63% of the ceramic restorations received by the dental laboratory. In addition, 23% of the dental practices were equipped with a chairside CAD/CAM system.

In general, dentists are enthusiastic about digital technologies in their working field (70%). The number corresponds to a survey reporting that 68% of the Swiss population think that digital technologies offer new opportunities, whereas 21% see a potential threat (DIGITAL.SWISS 2018). Only 5% of the dentists negatively rated the increasing influence of digitalisation.

The present survey showed that the grade of digitalisation in dental practices is high. In 2017, the Swiss government passed the ordinances on the federal law concerning the electronic patient dossier (EPD) (816.1 BUNDESGESETZ ÜBER DAS ELEKTRONISCHE PATIENTENDOSSIER 2018). Hospitals need to introduce the EPD within the next three years, whereas for out-patient health care providers participation is voluntary. Based on the high grade of digitalisation in dental practices and provided that the connectivity will be established by the dental software companies, dental practices may play a role model in the introduction of the EPD in out-patient practices. Patients are likely to benefit from an EPD which will be used by both in-patient and out-patient health care providers.

Conclusion

The present survey showed that digital technologies were predominantly used in dental practices for patient management. The dental treatment of patients may be supported by digital technologies in one third of the dental practices.

Zusammenfassung

Einleitung

Digitale Technologien haben in den letzten beiden Jahrzehnten in allen Lebensbereichen ihre Anwendung gefunden, so auch im Gesundheitswesen und in der Zahnmedizin. Das Ziel der vorliegenden Studie war es, zu bestimmen, wie und in welchem Umfang digitale Technologien in der Schweiz sowohl bei der Organisation der Zahnarztpraxis und bei der Administration als auch bei der Behandlung von Patienten zur Anwendung kommen.

Material und Methoden

Dazu wurde ein Fragebogen mit 68 Fragen erstellt und an insgesamt 3133 SSO-Mitglieder per Post verschickt. Um eine möglichst hohe Antwortrate zu erzielen, war es möglich, die Fragen schriftlich oder online zu beantworten. Der Fragebogen wurde im Juni 2016 versendet, und es wurden Antworten bis Ende 2016 berücksichtigt. Mithilfe der Antworten sollten demografische Daten zu den Zahnärzten/Zahnärztinnen (ZAZ) und den Zahnarztpraxen (ZAZ-P) erhoben werden. Zudem sollte der persönliche Digitalisierungsgrad der ZAZ (A0–A3), der öffentliche Digitalisierungsgrad der ZAZ-P (B0–B3) und der Digitalisierungsgrad innerhalb der ZAZ-P (C0–C4) bestimmt werden.

Resultate

Insgesamt wurden 1238 Fragebogen retourniert, was einer Rücklaufquote von 40% entspricht, wobei 52% schriftlich und 48% online beantwortet wurden. Die meisten ZAZ (97%) besaßen in ihrem Privatleben einen Computer (Smartphone, mobiler Computer oder Desktop-Computer), und 74% nutzten diesen sowohl privat als auch für berufliche Zwecke. Es zeigte sich, dass je jünger die ZAZ, desto höher der persönliche Digitalisierungsgrad. 43% der ZAZ hatten von zu Hause aus Zugriff auf zahnärztliche Dokumente, wobei meist administrative Arbeiten durchgeführt wurden und nur eine Minderheit (3%) auch zahnärztliche Behandlungen planten. Zahnärzte mit einem hohen persönlichen Digitalisierungsgrad waren eher in ZAZ-P mit einer höheren Anzahl Behandlungszimmer tätig. In der Hälfte aller ZAZ-P (52%) waren fünf oder mehr Desktop-Computer installiert, wobei in 32% der ZAZ-P bereits ein mobiler Computer verfügbar war. 69% der ZAZ-P hatten eine Homepage und 10% benutzten auch Social-Media-Kanäle. Für die Administration von Patientendaten wurde in 95% der ZAZ-P eine Software verwendet. Eine digitale Agenda wurde in 73% der ZAZ-P geführt, und 53% erinnerten ihre Patienten, wobei dies meist automatisiert mithilfe eines SMS geschah. Die Krankengeschichte wurde in 53% der ZAZ-P digital geführt und in 38% wurden Befunde auch digital aufgenommen. Am häufigsten kamen digitale Technologien für die dentale Bildgebung (Fotos/Röntgen) zur Anwendung. DVT und intraorale Scanner waren in 18% bzw. 23% der ZAZ-P verfügbar. Der höchste Digitalisierungsgrad innerhalb der ZAZ-P (C4) fand sich bei Kieferorthopäden (57%), wohingegen dieser Grad bei Allgemein-ZAZ bei 29% lag. Es zeigte sich, dass i) je jünger die ZAZ, ii) je jünger die ZAZ-P, iii) je grösser das Patienteneinzugsgebiet, und iv) je höher die Anzahl der Behandlungsräume, desto höher war der Grad der Digitalisierung innerhalb der ZAZ-P. In 23% der ZAZ-P war ein CAD/CAM-System verfügbar, um Rekonstruktionen chairside zu fertigen.

Diskussion

Die Umfrage zeigte, dass der höchste Digitalisierungsgrad bei 33% der ZAZ (A3) und bei 62% der ZAZ-P (C3/C4) erreicht wurde. Im Unterschied dazu wurde dieser Grad (B3) nur bei 10% der ZAZ-P erreicht. In 31% der Zahnarztpraxen bestand zudem die Möglichkeit die Behandlung des Patienten durch digitale Technologien zu unterstützen (C4). Der hohe persönliche Digitalisierungsgrad der Zahnärzte sowie die über 30-jährige Historie von CAD/CAM-Systemen in der Zahnmedizin könnten für den hohen Digitalisierungsgrad innerhalb der ZAZ-P verantwortlich sein. Die Mehrheit der ZAZ (70%) empfand den zunehmenden Einfluss von digitalen Technologien in der Zahnmedizin als positiv/sehr positiv. Dies entspricht auch dem allgemeinen Empfinden der Bevölkerung, die digitale Technologien als Chance sieht (69%), wohingegen 21% der Bevölkerung diese neuen Technologien als eine mögliche Gefahr wahrnehmen.

Résumé

Introduction

Les technologies numériques ont été utilisées dans tous les domaines de la vie au cours des deux dernières décennies, y compris les soins de la santé et la dentisterie. Le but de la présente étude était de déterminer en Suisse comment et dans quelle mesure les technologies numériques sont utilisées dans l'organisation du cabinet dentaire, dans l'administration et dans le traitement des patients.



Matériels et méthodes

À cette fin, un questionnaire de 68 questions a été préparé et envoyé au total à 3133 membres de SSO par courrier. Pour atteindre le taux de réponse le plus élevé possible, il était possible de répondre aux questions par écrit ou en ligne. Le questionnaire a été envoyé en juin 2016 et les réponses ont été prises en considération jusqu'à la fin de 2016. Les données démographiques devaient être collectées sur les dentistes et les cabinets dentaires en utilisant les réponses. En outre devaient être déterminés le degré de numérisation personnel des dentistes (A0–A3), le degré de numérisation publique des cabinets dentaires (B0–B3) et le degré de numérisation au sein des cabinets dentaires (C0–C4).

Résultats

Un total de 1238 sondages ont été retournés, ce qui représente un taux de réponse de 40 %, avec 52 % de réponses écrites et 48 % de réponses en ligne. La plupart des dentistes (97 %) avaient un ordinateur dans leur vie privée (smartphone, ordinateur portable ou ordinateur de bureau) et 74 % l'utilisaient aussi à titre privé à des fins professionnelles. Il est apparu que plus le dentiste était jeune, plus le degré de numérisation personnelle était élevé. 43 % des dentistes avaient accès à des dossiers dentaires depuis leur domicile, dans lesquels la plupart des tâches étaient administratives, et seulement une minorité d'entre eux (3 %) pour planifier des procédures dentaires. Les dentistes avec un degré de numérisation personnel élevé étaient plus susceptibles de travailler dans les cabinets dentaires avec un plus grand nombre de salles de traitement. Sur la moitié des cabinets dentaires (52 %), cinq ordinateurs de bureau ou plus étaient installés, 32 % des cabinets dentaires disposant déjà d'un ordinateur mobile. 69 % des utilisateurs des cabinets dentaires avaient une page d'accueil et 10 % utilisaient également des canaux de médias sociaux. Pour l'administration des données des patients, un logiciel a été utilisé dans 95 % des cas des cabinets dentaires. Une stratégie numé-

rique était maintenue dans 73 % des cas des cabinets dentaires et 53 % d'entre eux rappellent leurs patients la plupart automatisés à l'aide de SMS. Les antécédents médicaux étaient gérés numériquement dans 53 % des cas des cabinets dentaires et dans 38 % des cas, les résultats étaient enregistrés numériquement. Les technologies numériques les plus couramment utilisées sont en imagerie dentaire (photos/rayons X). La TVP et les scanners intraoraux étaient disponibles dans 18 % respectivement 23 % des cabinets dentaires. Le niveau de numérisation le plus élevé au sein des cabinets dentaires (C4) a été observé chez les orthodontistes (57 %), alors que chez le dentiste généralisé, ce taux était de 29 %. Il a été constaté que i) plus le dentiste était jeune, ii) plus le cabinet dentaire était jeune, iii) plus la zone de recrutement des patients était grande et iv) plus le nombre de salles de traitement était élevé, plus le degré de numérisation dans les cabinets dentaires était élevé. Dans 23 % des cabinets dentaires, un système CAD–CAM était disponible pour les reconstructions *chairside*.

Discussion

L'enquête a montré que le plus haut niveau de numérisation était atteint chez 33 % des dentistes (A3) et 62 % des cabinets dentaires (C3/C4). En revanche, cette teneur (B3) n'a été atteinte qu'à 10 % des cabinets dentaires. Dans 31 % des cabinets dentaires, il était également possible de soutenir le traitement du patient par les technologies numériques (C4). Le haut niveau de numérisation personnelle des dentistes et les systèmes CAO/FAO utilisés en dentisterie depuis plus de 30 ans pourraient expliquer le degré élevé de numérisation au sein des cabinets dentaires. La majorité des dentistes (70 %) ont constaté que l'influence croissante des technologies numériques en dentisterie était positive/très positive. Cela correspond également à la perception du public selon laquelle les technologies numériques sont une opportunité (69 %), tandis que 21 % de la population perçoivent ces nouvelles technologies comme un danger potentiel.

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